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Endogenospora, a new genus of anamorphic fungi from Venezuela

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Abstract — *Endogenospora aspectabilis* anam. gen. et sp. nov. found on a decaying branch in the "Las Veras" rainforest, Lara State, Venezuela, is described and illustrated. It is characterized by endogenous conidium ontogeny development at the reduced internal area of inflated or globose bases of conidiophores, vase-shaped conidiogenous cells and clavate to sub-cylindrical, (5–)7-septate, brown conidia with truncate base and rounded apex.

Key words — tropical rainforest, systematics, conidial fungi

Introduction

During a survey of microfungi in Lara state, Venezuela, an interesting and curious anamorphic fungus was collected on decaying branches of an unidentified plant. Its conidium ontogeny and conidiogenous event development in the inner and deep-seated conidiogenous cell showed some resemblance with the genus *Conioscypha* Höhn., but also is superficially similar to the genus *Ascoconidium* Seaver by the urceolate to elongated infundibuliform conidiogenous cells. Therefore, the new genus *Endogenospora* is described and illustrated herein.

Materials and methods

Samples of plant material were collected during an expedition in July 2009 through the forest "Las Veras," Lara State, Venezuela. Individual collections were placed in paper bags and taken to the laboratory, then incubated in Petri dishes at 25° C placed in a moist chamber composed of plastic containers (50 L capacity) with 200 ml of sterile water plus 2 ml of glycerol, and examined at regular intervals for the presence of microfungi. Mounts were prepared in polyvinyl alcohol-glycerol (8.0 g in 100 ml of water, plus 5 ml of glycerol) and measurements made at a magnification of × 1000. Micrographs were obtained with a Zeiss Axioskop 40 microscope.

Taxonomy

Endogenospora R.F. Castañeda, O. Morillo & Minter, **anam. gen. nov.**

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Coloniae in substrato naturali effusae, brunneae ad usque nigrae. Conidiophora plerumque nulla, in cellula conidiogena reducta, interdum septata. Cellulae conidiogenae endogenosae-holoblasticae, uniloculares, urceolatae, clavatae, subcylindricae vel prolongatae infundibuliformes, brunneae vel atrobrunneae, determinatae vel indeterminatae cum aliquot proliferationibus enteroblasticis percurrentibus, cum parietibus incrassatis, circa basim dispositae. Loci conidiogeni intra-suprabasilibus. Secessio conidiorum schizolytica. Conidia solitaria, clavata usque ad cylindrica, manifeste enterogenice producentia, pluriseptata, brunnea vel atrobrunnea, laevia vel verruculosa, sicca vel tenuitunicata, seriata, in massa sicca, congesta. Teleomorphosis ignota.

Species typica: *Endogenospora aspectabilis* R.F. Castañeda, O. Morillo & Minter

Etymology: Greek, *Endogeno-*, meaning endogenous, arising from inner and deep-seated layers of the conidiogenous cells; Latin *-spora* referring to the conidia.

Colonies on the natural substrate effuse, brown or black. Conidiophores mostly absent, reduced to conidiogenous cells, sometimes septate. Conidiogenous cells endogenous-holoblastic, unilocal, vase-shaped, clavate, subcylindrical or elongated infundibuliform, brown or dark, determinate or with several enteroblastic percurrent proliferations, thick-walled, internal and deep, located

Figs. 1–3. *Endogenospora aspectabilis*, photomicrographs from holotype (INIFAT C09/74). Conidiogenous cells and conidia. Enterogenous internal development of conidia near the base. Scale is indicated by bars = 10 μm.

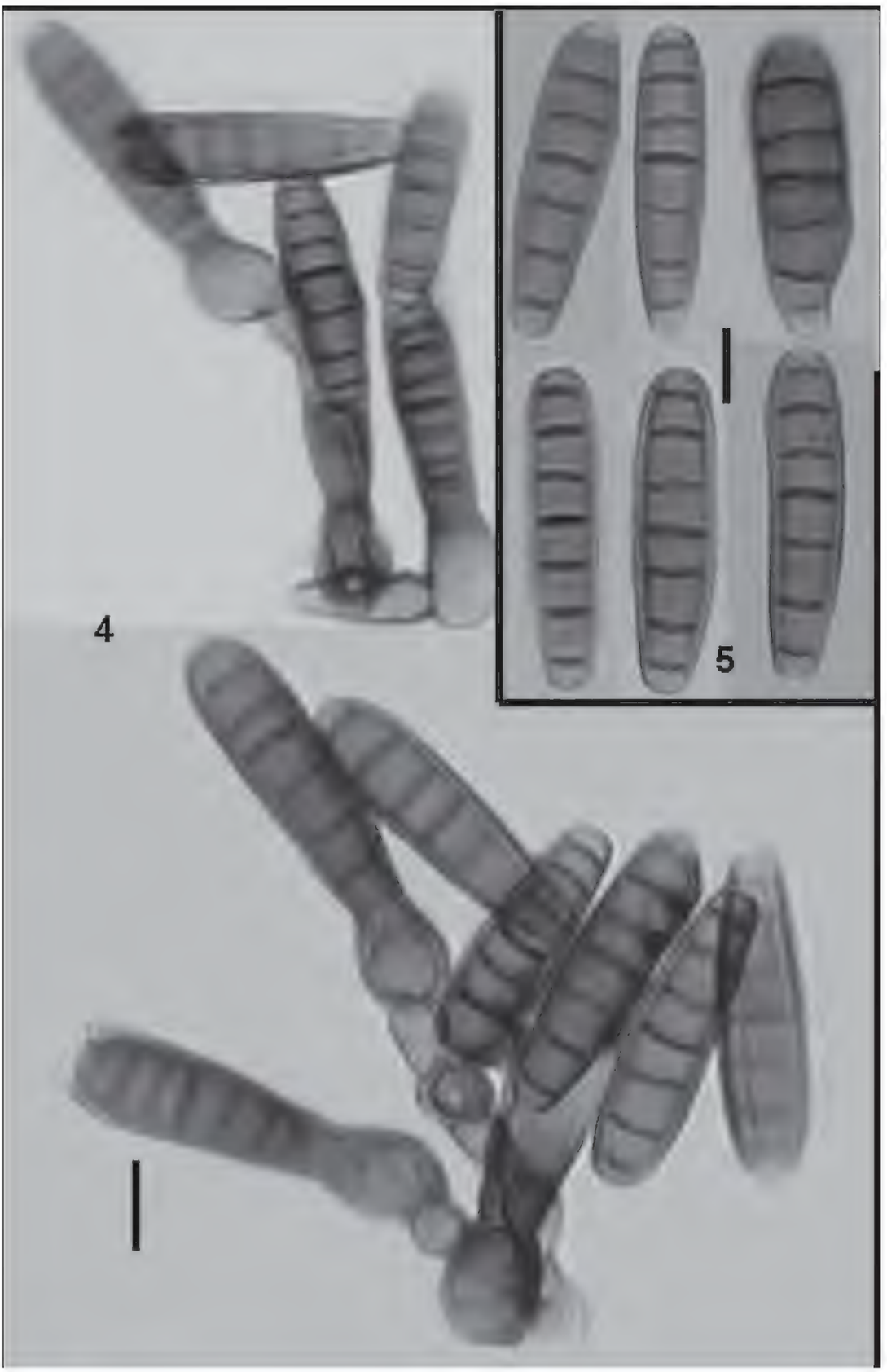
at the inflated base. Conidial secession schizolytic. Conidia solitary, clavate to cylindrical, enteroblastic, multi-septate, smooth or verrucose, dry or slightly tunicate, brown to dark brown, seriate, accumulating in dry masses.

Notes. The genus *Ascoconidium* can be compared with *Endogenospora* in conidium ontogeny, the shape and number of cells, but conidia are hyaline and sometimes dictyoseptate in the former; in both genera conidia are formed singly and successively after schizolytic secession, but conidia in *Ascoconidium* bear a conspicuous marginal frill produced by the separation process of the outer wall layer(s) and inner wall layer(s). The separation of the wall layers is not simultaneous, the outer wall layer(s) breaks first and conidia are observed attached only by the inner wall layer(s) as occurs in several anamorphic genera including *Stigmina* (Sutton & Pascoe 1989). The enterogenous conidium ontogeny occurs in an internal locus near the base, a process that shows obvious differences between *Ascoconidium*, *Endogenospora* and other genera such as *Chalara*, *Sporoschisma* and *Sporoschimopsis* as was discussed by Nag Raj & Kendrick (1975). Although the conidiogenous cells of these fungi have been described as "phialides", the events relating to conidiogenesis are different, and the broadly applied term phialide does not accurately describe these stationary conidiogenous cells, which produce successive enteroblastic conidia. In *Endogenospora aspectabilis* inner wall layer(s) near the inflated base produce successive conidia in a process similar to what Minter et al. (1982) interpreted as holoblastic in *Cryptosporiopsis* sp. Minter et al. (1982) defined holoblastic as "the mode of production of cell wall in which, following completion of any developmental stage, the fungus in a new stage lays down wall layers which are continuous with all of the wall layers used in the previous stage." This definition supports the description of conidiogenous cells in *Endogenospora aspectabilis* as endogenous-holoblastic because all inner wall layers are involved in the production of successive conidia and are continuous with the conidia wall layer. The vase-shaped conidiophores can be described as unicellular conidiomata when at maturation they produce successive conidia. *Endosporoideus* W.H. Ho et al. (2005) is also superficially similar to *Endogenospora*, but the former does not produce successive conidia, and after maturation shows disarticulation of the conidial cell similar to the "chlamydospora" of *Chalara* spp.

Endogenospora aspectabilis R.F. Castañeda, O. Morillo & Minter, **sp. nov.**

MycoBank MB 515397 Figs 1–6

Coloniae in substrato naturali effusae, atrobrunneae vel brunneae. Mycelium plerumque superficiale vel in substrato immersum, ex hyphis septatis, cylindricis, aliquando cum cellulis globosis vel inflatis, (2.5–)4–6 µm diam., ramosis, dilute brunneis ad usque brunneis. Conidiophora plerumque nulla in cellula conidiogena reducta vel mononemata,



Figs. 4–5. *Endogenospora aspectabilis*, photomicrographs from holotype (INIFAT C09/74).
4. Conidiogenous cells and conidia. 5. Conidia.
Scale is indicated by bars = 10 μm.

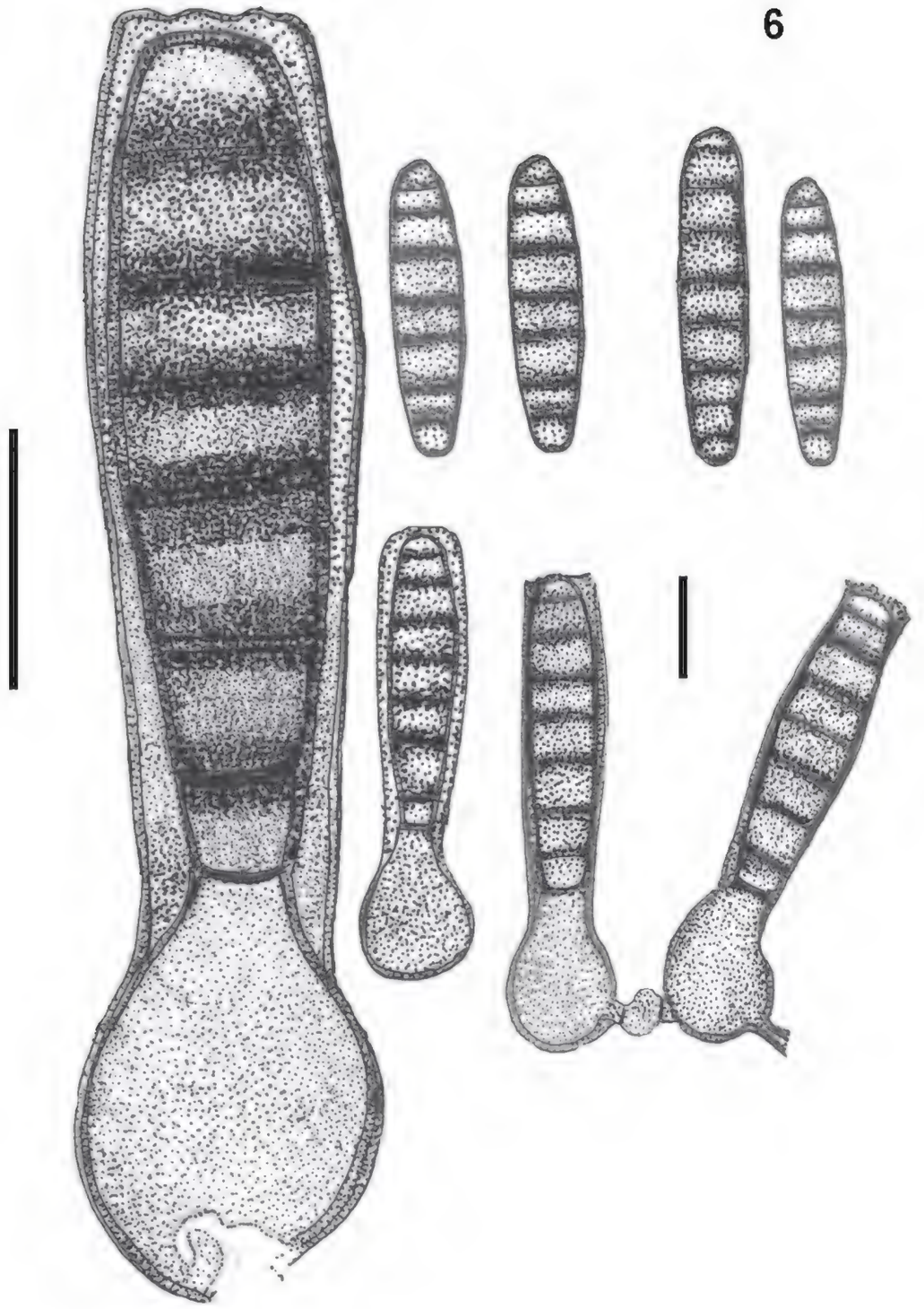


Fig. 6. *Endogenospora aspectabilis*, drawing from holotype (INIFAT C09/74).
Conidiogenous cells and conidia..
Scale is indicated by bar = 10 µm.

fasciculata, 1-septata, laevia, brunnea, urceolata, vel prolongata, infundibuliformia, plerumque inflata vel globosa ad basim, 42–53 × 8–13 µm. Cellulae conidiogenae *urceolatae, clavatae, subcylindricae vel prolongatae infundibuliformes, ad basim globosae, enterogenosae, uniloculares, discretae, brunneae vel atrobrunneae, plerumque determinatae, interdum indeterminatae cum 1–2 proliferationibus enteroblasticis percurrentibus, 7–11 × 8–13 µm, cum parietibus incrassantis, brunneis, circa basim dispositae. Locis conidiogenis intra-suprabasilibus, complanatis.* Secessio conidiorum *schizolytica.* Conidia *solitaria, endogenica, clavata usque ad cylindrica, sub-truncata ad basim, rotundata ad apicem, (5–)7-septata, brunnea vel atrobrunnea, sed utrimque pallidiora, i.e. pallide brunnea, 32–38 × 8.5–10.5 µm, laevia vel tenuitunicata, seriata, in massa atrobrunnea, sicca congesta. Teleomorphosis ignota.*

Type: Las Veras, Barquismeto, Lara, Venezuela, on decaying branch of an unidentified plant, 25.VI.2009. O. Morillo (**Holotype**: INIFAT C09/74).

Etymology: Latin, *aspectabilis* – meaning visible, worthy of being seen.

Colonies on the natural substrate effuse, dark brown or brown. Mycelium mostly superficial and somewhat immersed; hyphae septate, branched, cylindrical and sometimes with globose to inflated, thickened cells, (2.5–)4–6 µm diam., smooth-walled, pale brown to brown. Conidiophores mostly absent, reduced to conidiogenous cells, but sometimes macronematous, mononematous, fasciculate, erect, straight, 1-septate, vase-shaped to elongated infundibuliform, always inflated or globose at the base, smooth-walled, 42–53 × 8–13 µm, brown or dark brown at the base, pale brown towards the apex. Conidiogenous cells unilocal, endogenous, enterogenous, globose, vase-shaped, clavate to slightly infundibuliform, discrete, determinate or indeterminate with 1–2 enteroblastic percurrent proliferations, 7–11 × 8–13 µm, with thickened, brown wall, smooth, arranged at the base near the bottom of the conidiomata. Conidiogenous loci internal and supra-basal, flattened. Conidia solitary, endogenously produced, clavate to sub-cylindrical, truncate at the base, rounded at the apex, (5–)7-septate, darkened at the septa, brown to dark brown and pale brown at the ends, 32–38 × 8.5–10.5 µm, smooth-walled or slightly tunicate, successively produced and accumulating in dark brown and dry masses. Teleomorph unknown.

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Literature cited

Ho WH, Yanna, Hyde KD, Goh TK. 2005. *Endosporoideus* gen. nov., a mitosporic fungus on *Phoenix hanceana*. Mycologia 97: 238–245.

Minter DW, Kirk PM, Sutton BC. 1982. Holoblastic phialides. Transactions of the British Mycological Society 79: 75–93.

Nag Raj TR, Kendrick WB. 1975. A monograph of *Chalara* and allied genera. Waterloo: Wilfrid Laurier University Press.

Sutton BC, Pascoe IG. 1989. Reassessment of *Peltosoma*, *Stigmina* and *Batcheloromyces* and description of *Hyphothyrium* gen. nov. Mycological Research 91: 210–222.